Sickness absence as a measure of health status and functioning: from the UK Whitehall II study

Michael Marmot, Amanda Feeney, Martin Shipley, Fiona North, S L Syme

Department of
Epidemiology and
Public Health,
University College
London Medical
School,
66–72 Gower Street,
London WC1E 6EA
M Marmot
A Feeney
M Shipley

Department of
Preventive and Social
Medicine,
University of Otago,
Dunedin,
New Zealand
F North

School of Public
Health,
University of
California,
Berkeley
CA 94720, USA
S L Syme

Correspondence to:
Professor M Marmot.

Accepted for publication
September 1995

Abstract

Study objective – To investigate the relationship between self reported health status and sickness absence.

Design – Analysis of questionnaire and sickness absence data from the first phase of the Whitehall II study – a longitudinal study set up to investigate the degree and causes of the social gradient in morbidity and mortality.

Setting – London offices of 20 civil service departments.

Participants – Altogether 6895 male and 3413 female civil servants aged 35–55 years. Analysis was conducted on 88% of participants who had complete data for the present analysis.

Main results – A strong inverse relation between the grade of employment (measure of socioeconomic status) and sickness absence was observed. Men in the lowest grade had rates of sickness absence six times higher than those in the highest grade. For women the corresponding differences were two to five times higher, In general, the longer the duration of absence, the more strongly did baseline health predict rates of absence. However, the health measures also predicted shorter spells, although to a lesser extent. Job satisfaction was strongly related to sickness absence with higher rates in those who reported low job satisfaction. After adjusting for health status the association remained for one to two day absences, but was greatly reduced for absences longer than three days.

Conclusion – There was a strong association between ill health and sickness absence, particularly for longer spells. The magnitude of the association may have been underestimated because of the strength of the association between grade of employment and sickness absence. It is proposed that sickness absence be used as an integrated measure of physical, psychological, and social functioning in studies of working populations.

(*J Epidemiol Community Health* 1995;49:124–130)

The costs of sickness absence to government and industry are substantial. In the United Kingdom, more than 370 million working days are lost each year due to certified incapacity,[1] with a cost to British business estimated at £13 billion.[2]

Sickness absence is not always thought to be a reliable indicator of morbidity.[3] An impolite view has been that non-attendance for work has more to do with absence than with sickness and can best be explained by concepts such as the absence culture,[4][5] where sickness absence is viewed as a voluntary behaviour, influenced by factors such as shared attitudes to work or the employees' satisfaction with their jobs. It is thus an industrial design problem rather than a health problem. If sickness absence is a reflection of ill health, however, then it is a health problem with profound economic impact. It is of great importance, therefore, to determine if sickness absence is best viewed as a measure of morbidity or as a manifestation of job dissatisfaction or other problems. If it is a measure of morbidity, prevention must be preceded by knowledge of predictors.

The opportunity to study these questions comes from the Whitehall II study – a cohort of 10 308 British civil servants. Men and women aged 35–55 underwent a health examination in 1985–88 and sickness absence was recorded subsequently. It may be thought that short spells of absence are less likely to reflect underlying ill health than longer spells, which require a medical certificate. In this paper, we examine the degree to which measures of health status and job satisfaction predict spells of absence of different duration, and point to major predictors of sickness absence.

Methods

STUDY POPULATION

All non-industrial civil servants aged 35–55 working in the London offices of 20 departments were invited to participate in this study. The overall response rate was 73% (74% for men and 71% for women). The true response rates are likely to be higher, however, because around 4% of those on the list of employees had moved before the study, and were thus not eligible for inclusion. The response rate varied by employment grade. It was 81% in the top three employment grade categories (defined below) and 68% among the lower three categories. In total, 10 308 civil servants participated, of whom 66·9% (6895) were men and 33·1% (3413) women.

BASELINE SURVEY

Between September 1985 and March 1988, participants completed questionnaires and attended a screening examination. The questionnaires provided the baseline information for this analysis. The following health status measures were recorded: the London School

of Hygiene cardiovascular questionnaire on angina pectoris and possible myocardial infarction,[6] the Medical Research Council chronic bronchitis questionnaire,[6] the general household survey long-standing illness question,[7] questions on past medical history of doctor-diagnosed illness, current medications, health problems over the past 12 months, symptoms over the past 14 days, self rated health status over the past 12 months, minor psychiatric morbidity,[8] diagnosis of diabetes, and, in women, presence of premenstrual and menopausal symptoms. Detailed information on work characteristics was also obtained using a 67 item questionnaire. Data relating to job satisfaction have been used in this analysis. Further details of the work characteristics and other data collected have been described elsewhere.[9 10]

Information on grade of employment was obtained by asking participants to give their civil service grade at the time of the baseline survey. Changes in grade during the follow up period were not analysed in this paper. On the basis of salary, the civil service identifies 12 nonindustrial grades which, in order of decreasing salary, consist of seven "unified grades" – senior executive officers (SEOs), higher executive officers (HEOs), executive officers (EOs), clerical officers, and clerical assistants and office support staff. The term "unified grade" is used by the civil service to refer to the combination of administrative grades (previously known as permanent secretary, deputy secretary, under secretary, assistant secretary, senior principal and principal) and professional or technical staff with equivalent salaries. Similarly, the remaining professional or technical staff are combined with administrative grades (SEOs, HEOs and EOs) on the basis of salary. For analysis, to obtain significant numbers, we combined unified grades 1–6 into one category and clerical officers, clerical assistants, and office support staff into another category, thus producing six grade categories. There was a steep increment in salaries between grade categories – from an annual salary in 1987 of £3060–£6790 in category 6 to £18 020–£62 100 in category 1. However, most of the civil servants in the top category were at the lower end of the pay scale, with 82% of men and 83% of women in category 1 earning between £18 020–£27 065. There were also marked differences in other socioeconomic indicators (education, housing tenure, car ownership, and father's occupation) in relation to grade of employment and these have been described elsewhere.[9]

SICKNESS ABSENCE RECORDS

Computerised sickness absence records were obtained annually from civil service pay centres. These records included the first and last dates of all absences and the reason for absence. For absences of seven days or less, civil servants were able to complete their own certificate and explain the absence. For absences longer than seven days, a medical certificate was required. Sickness absence records were checked for inconsistencies. Overlapping, consecutive, or duplicate spells of sickness absence were merged after taking account of weekends and public holidays. This affected less than 1% of all spells of sickness absence. Most participants (93%) gave consent for follow up based on their sickness absence records. Of these a small proportion of records (5%) could not be identified. Sickness absence records of 9072 participants (88% of the total sample) were examined over a mean period of 20 months (range 0·3–39·6 months).

STATISTICAL ANALYSIS

To examine the relationship between the health status measures and spells of absence of different duration we have analysed separately spells of length: 1–2 days; 3–7 days; 8–21 days; and >21 days. The rationale for analysing spells of different duration is that if sickness absence is influenced by both ill health and psychosocial circumstances, then we would expect ill health to be a stronger predictor of longer spells, and psychosocial circumstances to be more important predictors of shorter spells.

For each individual the number of spells of sickness absence of each type was computed and the follow up period was measured in person-years. Rates of sickness absence were computed and are expressed per 100 person years. Age adjusted rates were calculated by direct standardisation using the total study population as the standard.

Adjusted rate ratios and their 95% confidence intervals (95% CI) were calculated for men and women separately using Poisson regression. Details of the method used have been published previously.[10] In brief, it was assumed that for each participant the occurrence of each spell followed a Poisson distribution. For shorter spells (1–2 day and 3–7 day spells) there was considerable residual variation in excess of the Poisson distribution (over dispersion). This over dispersion has no effect on the rate ratio estimates. The estimates of 95% CI were, however, adjusted for this over dispersion, the effect of which was to increase the width of the 95% CI by about 50%. For longer spells (8–21 day and >21 day spells), no over dispersion was detected.

Individuals with incomplete data were excluded from the analyses involving those variables. Consequently, the number of individuals varied when different explanatory variables were considered. The regression models were fitted using the statistical package *GLIM*[11] and all other analyses were performed using the statistical package, *Statistical Analysis System*.[12]

Results

The most striking feature of sickness absence in the Civil Service is its relation to grade of employment (table 1). Among both men and women, for all spells of absence, the lower the employment grade, the higher is the rate of sickness absence. The reasons for this relation to grade of employment have been examined previously.[10] Because grade is also related to other measures of health, the relation of health

Table 1   Sickness absence rates and number of spells in relation to sex and employment grade

Men (n = 6222) grade	Length of sickness absence spells (d)							
	1–2		3–7		8–21		≥22	
	Rate*	(No of spells)	Rate*	(No of spells)	Rate*	(No of spells)	Rate*	(No of spells)
UGI –UG6	31·9	(473)	11·8	(185)	2·8	(46)	1·9	(32)
UG7	62·9	(1543)	22·8	(558)	4·4	(107)	3·1	(68)
SEO	77·5	(1492)	28·1	(535)	6·1	(117)	4·2	(68)
HEO	100·5	(2292)	39·5	(880)	8·9	(202)	4·0	(76)
EO	170·4	(7257)	54·5	(727)	14·1	(186)	6·6	(72)
Clerical/support	187·2	(1619)	75·3	(647)	18·4	(163)	13·8	(96)
Women (n = 2850) grade								
UG1 –UG6	61·0	(98)	22·4	(36)	7·0	(11)	3·0	(4)
UG7	65·2	(250)	23·1	(82)	3·7	(14)	2·9	(11)
SEO	107·4	(299)	41·0	(110)	9·1	(25)	2·1	(7)
HEO	144·3	(966)	47·0	(316)	17·5	(110)	7·6	(41)
EO	167·8	(1539)	60·8	(575)	19·2	(182)	11·3	(85)
Clerical/support	174·8	(3850)	78·8	(1800)	27·9	(657)	15·9	(289)

* Age adjusted rates expressed per 100 person years.
UG = unified grades; SEO = senior executive officer, HEO = higher executive officer; EO = executive officer

Table 2   Rate ratios of different lengths of sickness absence associated with a 10 year increase in age

Length of sickness absence spells (d)	Men		Women	
	RR*	(95% CI)	RR*	(95% CI)
1–2	1·00	(0·95, 1·05)	0·84	(0·79, 0·90)
3–7	1·05	(0·99, 1·11)	1·01	(0·94, 1·09)
8–21	1·16	(1·04, 1·30)	1·14	(1·03, 1·27)
≥22	1·62	(1·38, 1·90)	1·38	(1·17, 1·63)

* Rate ratios (95% confidence intervals (CI)) adjusted for grade of employment

measures to sickness absence in this paper is presented adjusted for grade.

Age was a strong predictor of morbidity. Table 2 shows the slope of the relationship between sickness absence spells of different duration and age. The rate ratios show the relative change in rates for each length of spell of absence associated with a 10 year increase in age. There is no association in men, and a negative association in women, between spells of sickness absence of 1–2 days' duration and age. However, the association becomes positive and stronger with increasing length of spell.

The relationship between baseline measures of health and rates of spells of absence of different duration among men and women are shown in tables 3 and 4. In general, the longer the duration of absence, the more strongly did the baseline measures of health predict rates of absence. However, most of the health measures that predicted longer spells of absence also predicted shorter spells, albeit to a lesser extent. The association between self reported health and sickness absence was particularly no-

Table 3   Rate ratios of different lengths of sickness absence in relation to measures of health status in men

Measures		Length of sickness spells (d)							
		1–2		3–7		8–21		≥22	
		RR* (95% CI)	No of spells	RR* (95% CI)	No of spells	RR* (95% CI)	No of spells	RR* (95% CI)	No of spells
Probable/possible ischaemia	No	1·0	(9001)	1·0	(3263)	1·0	(758)	1·0	(357)
on ECG	Yes	1·03 (0·92, 1·16)	(670)	1·11 (0·97, 1·27)	(266)	1·06 (0·82, 1·38)	(62)	1·89 (1·42, 2·53)	(55)
Angina by questionnaire	No	1·0	(9199)	1·0	(3345)	1·0	(777)	1·0	(387)
	Yes	1·37 (0·16, 1·61)	(331)	1·47 (1·22, 1·77)	(131)	1·26 (0·86, 1·85)	(27)	1·61 (1·00, 2·59)	(18)
History of diabetes	No	1·0	(9433)	1·0	(3458)	1·0	(796)	1·0	(405)
	Yes	1·19 (0·92, 1·54)	(130)	1·22 (0·90, 1·65)	(48)	1·54 (0·92, 2·57)	(15)	0·98 (0·41, 2·38)	(5)
Self reported health	Very good	1·0	(2419)	1·0	(852)	1·0	(176)	1·0	(64)
	Good	1·31 (1·21, 1·41)	(3946)	1·38 (1·26, 1·51)	(1463)	1·38 (1·15, 1·66)	(307)	2·25 (1·69, 2·99)	(182)
	Average	1·70 (1·56, 1·84)	(2527)	1·76 (1·59, 1·94)	(917)	2·11 (1·74, 2·57)	(235)	2·78 (2·04, 3·79)	(110)
	Poor	2·30 (2·04, 2·60)	(748)	2·53 (2·19, 2·92)	(290)	4·12 (3·21, 5·27)	(100)	6·15 (4·27, 8·88)	(54)
Regular cough with	No	1·0	(8477)	1·0	(3114)	1·0	(700)	1·0	(358)
phlegm in winter	Yes	1·24 (1·13, 1·36)	(1077)	1·21 (1·08, 1·36)	(389)	1·57 (1·29, 1·91)	(115)	1·57 (1·02, 1·84)	(51)
Long standing illness	No	1·0	(4339)	1·0	(1557)	1·0	(305)	1·0	(131)
	Yes	1·29 (1·20, 1·39)	(2558)	1·25 (1·14, 1·36)	(893)	1·67 (1·41, 1·98)	(239)	2·19 (1·73, 2·79)	(142)
No of health problems	None	1·0	(1760)	1·0	(588)	1·0	(121)	1·0	(55)
in the last year	1	1·24 (1·12, 1·36)	(2007)	1·27 (1·13, 1·43)	(692)	1·28 (1·01, 1·63)	(143)	1·89 (1·36, 2·63)	(96)
	2—4	1·48 (1·36, 1·62)	(2801)	1·63 (1·46, 1·81)	(1037)	1·81 (1·46, 2·25)	(239)	1·63 (1·17, 2·26)	(101)
	>4	2·24 (1·87, 2·68)	(307)	2·94 (2·40, 3·59)	(135)	3·71 (2·56, 5·37)	(37)	3·65 (2·15, 6·18)	(19)
Psychiatric symptoms	No	1·0	(6765)	1·0	(2429)	1·0	(550)	1·0	(281)
	Yes	1·27 (1·19, 1·45)	(2860)	1·34 (1·24, 1·45)	(1083)	1·47 (1·27, 1·70)	(265)	1·46 (1·19, 1·80)	(131)
Drug therapy for	No	1·0	(8997)	1·0	(3289)	1·0	(765)	1·0	(376)
hypertension	Yes	1·40 (1·29, 1·52)	(339)	1·10 (0·91, 1·34)	(128)	1·25 (0·89, 1·75)	(37)	1·78 (1·21, 2·62)	(29)
Current smoker	No	1·0	(7682)	1·0	(2704)	1·0	(611)	1·0	(317)
	Yes	1·09 (1·01, 1·18)	(1985)	1·29 (1·19, 1·41)	(823)	1·42 (1·21, 1·67)	(210)	1·29 (1·01, 1·63)	(95)

* Rate ratios (95% confidence intervals (CI)) adjusted for age and grade of employment.

Table 4 Rate ratios of different lengths of sickness absence in relation to measures of health status in women

Measures		Length of sickness spells (d)							
		1–2		3–7		8–21		≥22	
		RR* (95% CI)	No of spells	RR* (95% CI)	No of spells	RR* (95% CI)	No of spells	RR* (95% CI)	No of spells
Probable/possible ischaemia on ECG	No	1·0	(6522)	1·0	(2686)	1·0	(917)	1·0	(406)
	Yes	0·98 (0·84, 1·14)	(469)	1·11 (0·95, 1·30)	(227)	1·11 (0·88, 1·39)	(80)	0·90 (0·62, 1·30)	(30)
Angina by questionnaire	No	1·0	(6453)	1·0	(2685)	1·0	(934)	1·0	(402)
	Yes	1·47 (1·26, 1·72)	(428)	1·47 (1·23, 1·75)	(178)	1·15 (0·86, 1·54)	(49)	1·20 (0·78, 1·84)	(22)
History of diabetes	No	1·0	(6846)	1·0	(2848)	1·0	(966)	1·0	(424)
	Yes	1·24 (0·89, 1·73)	(92)	1·39 (1·00, 1·94)	(47)	1·77 (1·15, 2·74)	(21)	1·61 (0·83, 3·11)	(9)
Self reported health	Very good	1·0	(1261)	1·0	(501)	1·0	(132)	1·0	(44)
	Good	1·25 (1·12, 1·39)	(2451)	1·26 (1·10, 1·44)	(987)	1·52 (1·24, 1·86)	(312)	2·05 (1·46, 2·86)	(141)
	Average	1·56 (1·40, 1·74)	(2412)	1·63 (1·45, 1·85)	(1052)	2·32 (1·90, 2·82)	(403)	3·05 (2·20, 4·23)	(180)
	Poor	2·20 (1·91, 2·52)	(868)	2·31 (1·98, 2·70)	(374)	3·42 (2·70, 4·32)	(149)	4·97 (3·43, 7·22)	(72)
Regular cough with phlegm in winter	No	1·0	(6313)	1·0	(2618)	1·0	(870)	1·0	(369)
	Yes	1·14 (1·00, 1·31)	(589)	1·17 (1·01, 1·42)	(255)	1·51 (1·24, 1·84)	(110)	2·04 (1·56, 2·72)	(63)
Long standing illness	No	1·0	(3151)	1·0	(1237)	1·0	(404)	1·0	(140)
	Yes	1·19 (1·08, 1·31)	(1710)	1·28 (1·15, 1·42)	(736)	1·40 (1·20, 1·64)	(270)	2·15 (1·71, 2·72)	(146)
No of health problems in the last year	None	1·0	(962)	1·0	(360)	1·0	(126)	1·0	(54)
	1	1·18 (1·03, 1·35)	(1332)	1·31 (1·13, 1·53)	(569)	1·28 (1·02, 1·60)	(197)	0·87 (0·60, 1·26)	(58)
	2–4	1·39 (1·23, 1·58)	(2173)	1·46 (1·27, 1·69)	(880)	1·33 (1·09, 1·65)	(289)	1·47 (1·08, 2·02)	(138)
	>4	1·61 (1·33, 1·96)	(361)	1·74 (1·40, 21·7)	(158)	1·64 (1·20, 2·26)	(55)	2·27 (1·46, 3·51)	(33)
Psychiatric symptoms	No	1·0	(4672)	1·0	(1948)	1·0	(688)	1·0	(282)
	Yes	1·17 (1·08, 1·27)	(2180)	1·22 (1·12, 1·34)	(908)	1·14 (0·99, 1·31)	(291)	1·43 (1·17, 1·74)	(145)
Drug therapy for hypertension	No	1·0	(6529)	1·0	(2703)	1·0	(907)	1·0	(395)
	Yes	1·12 (0·94, 1·34)	(348)	1·20 (1·00, 1·44)	(168)	1·33 (1·03, 1·71)	(65)	1·42 (0·98, 2·04)	(32)
Current smoker	No	1·0	(5361)	1·0	(2189)	1·0	(710)	1·0	(298)
	Yes	0·97 (0·89, 1·06)	(1626)	1·28 (1·16, 1·40)	(656)	1·21 (1·05, 1·39)	(288)	1·38 (1·12, 1·69)	(138)
Premenstrual "bloating"	No	1·0	(3107)	1·0	(1153)	1·0	(341)	1·0	(131)
	Yes	1·13 (0·99, 1·29)	(669)	1·24 (1·07, 1·44)	(281)	1·73 (1·40, 2·14)	(117)	2·09 (1·51, 2·88)	(53)

* Rate ratios (95% confidence intervals (CI)) adjusted for age and grade of employment.

Table 5 Rate ratios of different lengths of sickness absence in relation to self rated health status in men

Adjustments	Self rated health	Length of sickness absence spells (d)			
		1–2		3–7	
		RR	(95% CI)	RR	(95% CI)
Age, grade	Very good	1·0		1·0	
	Good	1·30	(1·21, 1·40)	1·37	(1·25, 1·50)
	Average	1·69	(1·56, 1·84)	1·73	(1·57, 1·92)
	Poor	2·31	(2·05, 2·61)	2·52	(2·19, 2·91)
Age, grade, rate of long spells of absence	Very good	1·0		1·0	
	Good	1·28	(1·19, 1·38)	1·32	(1·21, 1·44)
	Average	1·63	(1·50, 1·77)	1·60	(1·45, 1·77)
	Poor	2·15	(1·89, 2·43)	2·08	(1·79, 2·41)

Subjects with sickness absence records of less than six months have been excluded.

ticeable, especially for longer spells of absence.

The relationship between baseline measures of health and short spells of absence may partly be explained by the same individuals having higher rates of absence for both short and long spells. Table 5 shows the association between self rated health and short spells of 1–2 days and 3–7 days in men before and after adjusting for the rate of long spells of sickness absence. The figures show that after adjusting for the rate of long spells of absence, the association between self rated health and short spells was only slightly reduced. Similar results were seen in women (not shown).

Table 6 shows the relationship between job satisfaction and rates of spells of absence of different duration. Job satisfaction was more strongly associated with spells of 1–2 days than with longer spells of absence.

We have attempted to remove that part of the association that may be due to health status by adjusting for self reported health. Table 6 shows that in both men and women, the association between job satisfaction and longer spells of absence was greatly attenuated, resulting in a minimal association between job satisfaction and spells of absence of 3 days or more in length. In contrast, the strong association between job satisfaction and spells of 1–2 days remained after adjusting for self reported health.

Adjustment for job satisfaction had little effect on the relationship between self reported health and spells of sickness absence as reported in tables 3 and 4. The rate ratios for short spells of absence decreased by less than 5% and, in women, the rate ratios for long spells of absence increased, but again by less than 5%.

Discussion

The call from WHO to consider health in terms of social, physical, and mental wellbeing[13] has inspired considerable comment, much of it critical, and only some attempt to operationalise it.[14] Interestingly, some move towards this has come from the "outcomes" movement – the desire to evaluate the outcome of medical care not only in terms of disease

Table 6   Rate ratios of different lengths of sickness absence in relation to job satisfaction in men and women

	Job satisfaction*	Length of sickness absence spells (d)			
		1–2 RR† (95% CI)	3–7 RR† (95% CI)	8–21 RR† (95% CI)	≥22 RR† (95% CI)
Men Adjustments:					
Age, grade	High	1·0	1·0	1·0	1·0
	Low	1·33 (1·25, 1·42)	1·15 (1·04, 1·27)	1·06 (0·92, 1·22)	1·28 (1·05, 1·56)
Age, grade, self reported health	High	1·0	1·0	1·0	1·0
	Low	1·26 (1·18, 1·34)	1·08 (0·97, 1·20)	0·96 (0·84, 1·11)	1·14 (0·94, 1·40)
Women Adjustments:					
Age, grade	High	1·0	1·0	1·0	1·0
	Low	1·27 (1·18, 1·37)	1·13 (1·00, 1·27)	1·16 (1·02, 1·31)	0·98 (0·80, 1·19)
Age, grade, self reported health	High	1·0	1·0	1·0	1·0
	Low	1·21 (1·12, 1·30)	1·06 (0·94, 1·19)	1·05 (0·92, 1·19)	0·87 (0·71, 1·06)

* Job satisfaction levels classified as above and below the median score.
† Rate ratios (95% confidence intervals (CI)).

abatement but in terms of social and physical functioning and perceived wellbeing.[15]

It is in this context that sickness absence should be seen. It may be a socially biased and prescriptive view, but if healthy functioning for people in stable jobs is, by definition, attending for work; then absence from work indicates some lack of functioning – whether the causes are psychological, social or physical.

Sickness absence rates cannot be used uncritically as health measures. For example, countries as similar in health and socioeconomic level as Belgium and The Netherlands have differences in sickness absence rates that are likely to be due to differences in social security and other policies.[16] Similarly, time trends in absence rates in Sweden may relate to policy changes.[17] The question this paper addresses is the extent to which health is a predictor of sickness absence rates within one jurisdiction.

In the Whitehall II study, we have shown that three sets of factors predict sickness absence rates: personal factors such as age, sex, and health behaviours; social circumstances outside work; and aspects of the way work is organised.[10] Other studies have identified a number of risk factors: age, sex, socioecomonic status, type of employment, length of employment, and social circumstances.[18-20] Although sickness absence is, by definition, absence from work attributable to sickness, very few studies have examined the extent to which health predicts rates of sickness absence, and more specifically rates of absence of different duration.[18 20]

If sickness absence is a measure of ill health, then rates might be expected to be higher in individuals with other indicators or predictors of ill health.[18 20 21] In the data presented, age was not related to rates of spells of absence of 1–2 days, but was more strongly and significantly related to rates of longer spells of absence. Similarly, most measures of health were more strongly associated with rates of longer spells of absence than shorter spells. While longer spells of absence may be better indicators of ill health, short spells are not determined by social or psychological factors alone. Most of the health measures that pre-

dicted longer spells also predicted shorter spells, albeit to a lesser extent. For some, such as angina symptoms, self rated health and reported health problems in the last year, there was a strong relationship with both long and short spells of sickness absence. This association was virtually unchanged when adjustment was made for the possibility that some individuals may be prone to both short and long spells of absence.

To some extent, sickness absence may be a reflection of employees' perceptions of their health and their behaviour in response to illness rather than physical disease. In other words, those who have a tendency to complain may also have a greater tendency to take time off work than others who deny the presence of illness. A number of studies have reported associations between perceived ill health and sickness absence.[10 22-24] However, Semmence,[25] in several studies in the 1960s and 1970s, found that sickness absence was a reliable indicator of subsequent serious morbidity and medical retirements.

While illness behaviour and reporting bias probably contribute to sickness absence, they are unlikely to explain the strong associations which increase for spells of longer duration. Firstly, in other studies, self reported health is a strong predictor of mortality,[26] which suggests it reflects "real" pathology. Secondly, the questions on angina pectoris and winter cough and phlegm were quite specific and less likely to be influenced by a general tendency to complain.

A relationship between minor psychiatric morbidity as measured by the general health questionnaire[8] and sickness absence was reported by Jenkins[27] in a study of executive officers in the civil service, especially for spells of absence of more than seven days. A significant increase in illness and disease was also found in a Swedish study which followed participants over a 10 year period: those with a high psychiatric score were significantly more likely to develop cancer and other diseases.[28] A current debate is whether people who have minor psychiatric illness are more likely to report health problems, or whether having a psychiatric illness predisposes people to develop ill health? It has been argued that there

is a strong positive association between physical and psychiatric disorders.[29] The health and lifestyle survey found that reports of minor physical illness were significantly related to affective state in both men and women.[30] Whatever the causal direction, minor psychiatric morbidity is clearly related to measures of ill health and to sickness absence.

Might the findings from this sample of civil servants be in some way atypical? The sample was selected in several ways. It excluded people permanently absent from work due to unemployment or illness; it was confined to office workers in public service; and the overall response rate was 73%, which excluded about one-quarter due to non-response. Non-responders have been shown in other studies to be less healthy.[31] These factors should have reduced the level of ill health and disease in the study population compared with the general population. The most likely effect of these sources of selection bias, would have been to reduce the chance of observing the reported differences, but it is unlikely that this would change the relationship, within the cohort followed, between baseline levels of health and subsequent sickness absence rates.

Sickness absence is often considered to be a useful indicator of the quality of the work and home environment. Job satisfaction is likely to reflect a number of aspects of the work and home environment. Working conditions may influence the incidence and prevalence of disease[32] and thereby affect sickness absence rates. Alternatively, there may be a more "direct" effect on sickness absence independent of effects on health status. This might be the explanation for the data in tables 5 and 6. The association between job satisfaction and short spells of absence is not affected by adjusting for health status; the association with long spells is reduced appreciably. This suggests that the effect of working conditions on long spells of absence may be related to the effect of work on health. This will be explored more fully in a separate report.

It is also likely to relate more strongly to short spells of absence, rather than longer spells, and more likely to be independent of health status. The data presented provide some support for this assertion, when adjustment for self-rated health status had a minimal effect on the strong relationship between low job satisfaction and rates of spells of absence for 1–2 days.

The estimate of the size of association between measures of health and sickness absence may be conservative. All the analyses were adjusted for grade of employment, because of the strength of the association between grade and sickness absence rates.[10] If part of the reason for the higher rates of absence in lower grades is that they do have more ill health, then adjusting for grade is likely to underestimate the association between measures of ill health and sickness absence rates.

In addition to examining spells of different duration, it would be useful to examine spells with different reasons for absence. We are currently collecting data on diagnosis of certified absence and will be able to investigate further the relationship between baseline health and different disease categories.

We conclude that long spells of absence, greater than seven days, are likely to be health related. This is consistent with earlier studies.[18 20 25] From our data, it seems that ill health also plays an important part in shorter spells of absence. Nevertheless, studies concerned with ill health resulting in a medical diagnosis do well to focus on longer spells of absence. It may be, however, that the attempt to disaggregate a physical health component from the psychological and social elements is artificial. Grade of employment, for example is almost equally related to long spells, which are better predicted by health, and to short spells that are less well predicted. If healthy functioning is a mixture of social, psychological and physical functioning, then sickness absence may serve well as an integrated measure of functioning. It may therefore be useful as an "end point" in studies of the determinants of healthy functioning in working populations.

1 Central Statistical Office. *Regional trends*. Vol 20. London: HM Stationery Office, 1985.
2 Confederation of British Industry. *Too much time out? CBI Percom survey on absence from work*. London: CBI, 1993.
3 Anonymous. Sickness absence in hospital staff. (Editorial). *Lancet* 1979;ii:1278–1279.
4 Johns G, Nicholson N. The meaning of absence: new strategies for theory and research. In: *Research in Organizational Behaviour* 1982;4:127–72.
5 Nicholson N, Johns G. The absence culture and the psychological contract – who's in control of absence? *Academy of Management Review* 1985;10:397–407.
6 Rose GA, Blackburn H, Gillum RF, Prineas RJ. *Cardiovascular survey methods*. Geneva: WHO, 1982.
7 Office Population Censuses and Surveys. *General household survey 1977*. London: HMSO, 1979.
8 Goldberg DP. In: *The detection of psychiatric illness by questionnaire*. London: Oxford University Press, 1972.
9 Marmot MG, Davey Smith G, Stansfield S, *et al*. Health inequalities among British civil servants: the Whitehall II study. *Lancet* 1991;337:1387–93.
10 North F, Syme SL, Feeney A, Head J, Shipley MJ, Marmot MG. Explaining socioeconomic differences in sickness absence: the Whitehall II study. *BMJ* 1993;306:361–6.
11 Numerical Algorithms Group. *The GLIM system release 3.77 Manual*. Oxford: 1987.
12 SAS Institute. *SAS user's guide*. Cary NC, SAS Institute Inc, 1985.
13 World Health Organisation. *Health for all by the year 2000*. Copenhagen: World Health Organisation, Regional Office for Europe, 1986.
14 Berkman LF, Breslow L. *Health and ways of living – The Alameda county study*. New York, Oxford: Oxford University Press, 1983.
15 Ware JE. Measuring patient function and well-being: some lessons from the medical outcomes study. In: Heithoff KA, Lohr KN, eds. *Effectiveness and outcomes in health care*. Washington D.C. National Academy Press, 1990; 107–119.
16 Prins R, Graaf De A. Comparison of sickness absence in Belgium, German, and Dutch Firms. *Br J Ind Med* 1986; 43:529–36.
17 Alexanderson K, Leijon M, Akerlind I, Rydh H, Bjurulf P. Epidemiology of sickness absence in a Swedish county in 1985, 1986 and 1987. *Scand J Soc Med* 1994;22:27–34.

18 Taylor PH. Occupational and regional associations of death, disablement and sickness absence among Post Office staff 1972–75. *Br J Ind Med* 1976;**33**:230–35.

19 McKeown KD. Sickness absence. *J R Soc Med* 1989;**82**: 188–9.

20 Chevalier A, Luce D, Blanc C, Goldberg M. Sickness absence at the French National Electric and Gas Company. *Br J Ind Med* 1987;**44**:101–10.

21 Searle SJ. Sickness absence and duration of service in the Post Office 1982–3. *Br J Ind Med* 1986;**43**:458–64.

22 Taylor PJ. Personal factors associated with sickness absence. *Br J Ind Med* 1968;**25**:106–17.

23 McKenna SP, Hunt SM, McEwen J. Absence from work and perceived health among mine rescue workers. *J Occup Med* 1981;**31**:151–7.

24 Kristensen TS. Sickness absence and work strain among Danish slaughterhouse workers: an analysis of absence from work regarded as coping behaviour. *Soc Sci Med* 1991;**32**:15–27.

25 Semmence AM. The politics of occupational medicine. *J R Soc Med* 1994;**80**:668–73.

26 Idler EL, Angel RJ. Self-rated health and mortality in the NHANES-I epidemiologic follow-up study. *Am J Public Health* 1990;**80**:446–52.

27 Jenkins R. Minor psychiatric morbidity in employed young men and women and its contribution to sickness absence. *Br J Ind Med* 1984;**42**:147–54.

28 Hagnell O. *Ann N Y Acad Sci* 1966;**125**:846.

29 Eastwood MR, Trevelyan MH. Relationship between physical and psychiatric disorder. *Psychol Med* 1972;**2**:363–72.

30 Cox BD, Blaxter M, Buckle AJL, *et al.* The health and lifestyle survey: Preliminary report. Cambridge: Health and Promotion Research Trust, 1987.

31 Alderson M. *An introduction to epidemiology.* Macmillan: London and Basingstoke, 1976.

32 Karasek R. Theorell T. *Healthy work: Stress, productivity and the reconstruction of working life.* New York: Basic Books, 1990.